

A Research Bulletin

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Adaptive Traffic Signals in Lee's Summit

Summary:

Based on the results of research, the added costs of In-Sync and possibly other Adaptive Traffic signal systems are effective at reducing travel time, delay, time spent in congestion, stops at signals, fuel consumption, and emissions.

The study found that for predictable conditions where engineers had manually optimized the signals, the new system had no change, for the better or worse. However, in all other conditions, the automatic system produced results consistent with manual optimizations.

Cross street traffic delays mostly changed from a decreased 3 seconds to an increased 12 seconds. This generally small increase in side street delay resulted in main street travel time reduced 0% to 39%, for as much as 2.3 minutes less delay, and as much as 95% fewer stops, per trip through the corridor.

Background:

In March 2009, the Missouri Department of Transportation (MoDOT) installed a new adaptive traffic signal system along 2.5 miles of the MO 291 corridor between I-470 and US 50 in Lee's Summit. This was MoDOT's first installation of the InSync system, developed by Rhythm Engineering, and the 12-signal MO 291 corridor included more signals than any previous installation of the system. MoDOT engaged Midwest Research Institute (MRI) to evaluate the system's performance by comparing operational measures taken before the implementation of the system to the same measures taken 1 month and 5 months after implementation.

Results:

- Average travel time reduction of 2.5 minutes (40%) in the southbound direction during the noon rush hour, and between the morning and noon rush hours.
- No statistically significant increase in travel time during any time period.
- Average speed increased 5 to 10 mph in many time periods.
- System provided improvement during worst delay without harming other times.
- Increased delay on minor streets was outweighed by mainline improvements.
- Traffic counts indicated improvements were not due to changes in traffic patterns.
- System appears to be a good investment for MoDOT in this location.

Best Applications for Adaptive Signals:

- Locations where traffic growth is expected.
- Locations where changing traffic is not easily addressed by time-of-day plans.
- Locations with a high number of incidents or special events.
- Locations where unbalanced traffic complicates coordination in both directions.
- Locations where signalized travel time is substantially higher than free flow time.

Additional Developments:

Since the study completed in March 2010, MoDOT has started installation of adaptive signals on Grindstone Parkway in Columbia and Range Line Road in Joplin.

